

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of predicting a lifetime of a filament for emitting thermoelectrons in an ion source, the method comprising:

successively measuring a resistance value of the filament during an operation of the ion source on the basis of current flowing through the filament and voltage across the filament; and

predicting the ~~lifetime of~~ time until the filament ~~till the filament~~ will be broken, on the basis of a rate of change of the resistance value.

2. (Previously Presented) A method of predicting a lifetime of a filament according to claim 1, further comprising:

computing a time till an application limits of the filament or a time left till the application limits of the filament, on the basis of a rate of change of the resistance value.

3. (Currently Amended) An ion source device comprising:
an ion source having a filament for emitting thermoelectrons;
a current measuring device for measuring current flowing through the filament;
a voltage measuring device for measuring voltage across the filament;

a resistance operation device for computing a resistance value of the filament by using the current and the voltage measured by the current and voltage measuring devices; and

a prediction operation device for computing a time at which ~~till~~ an application limits of the filament will be reached or a time left till the application limits of the filament is reached, on the basis of a rate of change of the resistance value computed by the resistance operation device.

4. (Currently Amended) An ion source device according to claim 3, further comprising:

a display device for displaying the time at which ~~till~~ the application limits of the filament or the time left till the application limits of the filament will be reached.

5. (Currently Amended) An ion source device according to claim 3, further comprising:

a comparing device for comparing the time left till the application limits of the filament will be reached with a predetermined reference value, and producing an alarm signal when the time left till the application limits of the filament is reached is smaller than the predetermined reference value.

6. (New) An ion source device comprising:

an ion source having a filament for emitting thermoelectrons;

a current measuring device for measuring current flowing through the filament;

a voltage measuring device for measuring voltage across the filament;

a resistance operation device for computing a resistance value of the filament by using the current and the voltage measured by the current and voltage measuring devices;

a prediction operation device for computing a time at which an application limit of the filament will be reached or a time left until the application limit of the filament is reached, on the basis of a rate of change of the resistance value computed by the resistance operation device; and

a display device for displaying the time at which the application limit of the filament is reached or the time left until the application limit of the filament is reached.